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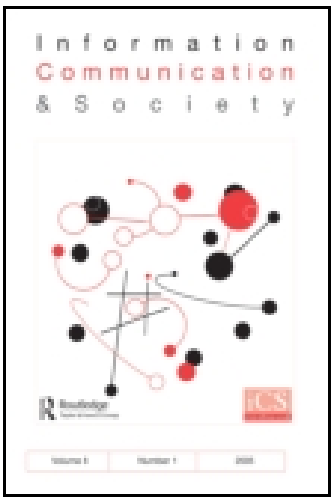

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Reconfiguring Friendships: Social relationships and the Internet

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Corinna di Gennaro & William H. Dutton

RECONFIGURING FRIENDSHIPS

Social relationships and the Internet

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Debate on the social role of the Internet has centred on whether its use will tend to isolate or connect individuals, undermining or reinforcing social ties. This study moves away from this focus on more or less connectivity to explore the degree to which people use the Internet to make new friends and, thereby, reconfigure their social networks. The analysis identifies those who create new ties through the Internet and investigates under what conditions these online ties migrate to face to face settings. The analysis is based on data from the 2005 Oxford Internet Survey (OxIS), a national probability sample survey of individuals aged 14 and over in Britain. The findings indicate that about 20 per cent of Internet users have met new friends online, and about half of these individuals go on to meet one or more of these virtual friends in person. Sociodemographic characteristics, such as being single, shape patterns of Internet use, and are related to the greater propensity of some individuals to make online social relationships. However, experience with the Internet and the ways people choose to use the Internet, such as for chatting or communicating more generally, are most directly associated with who makes new connections over the Internet and who does not. These findings suggest that the Internet plays an important role in reconfiguring the social networks of many users. Also, multivariate analyses indicate that the dynamics of online friendships are driven more by the idiosyncratic digital choices made by users of the Internet than by any mechanistic social or technological determinism.

Keywords Social relationships; Internet use; friends; reconfiguration of social networks

The impact of the Internet on social relationships has been at the centre of academic debates since the early days of Internet diffusion. In particular, scholars have focused on whether and how online social relationships are formed and how, if at all, they differ from those based on face to face social interaction.

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Since its inception, the Internet has allowed people to communicate with others through a growing variety of applications such as email, mailing lists, message boards like Usenet, and computer conferencing. Thus, even early enthusiasts saw this technology as a new means for enhancing social networks via the creation of virtual communities (Rheingold 1994). However, initial studies were sceptical about the utility of people using the Internet to create meaningful social relationships, due to the anonymity, lack of cues and lower social presence provided by the Internet. Moreover, the widespread diffusion and heavy use of personal computers and the Internet generated concern over the degree that time spent online would substitute for time spent in face to face social interaction; thus, attention shifted to whether Internet use would increase or decrease sociability.

Early studies of the impact of the Internet on offline sociability, such as Nie & Erbring's study (2000) and Kraut and colleagues' study (1998) found that Internet use detracted from time socializing with family and friends and that one consequence was that Internet users were more likely to be depressed. Later studies, however, countered these initial findings (Kraut *et al.* 2002). With the growth of Internet diffusion, a growing body of evidence has accumulated which shows that Internet users are as sociable offline as are non-users, if not more so, and that the Internet is used often as a tool to maintain and extend offline social relationships (Boase & Wellman 2006; Boase *et al.* 2006; Rice *et al.* 2007). The rapid growth of new social software applications such as Internet forums, Instant Messaging (IM), Internet Relay Chat (IRC), Blogs, Wikis and a variety of social network services has renewed interest in how people connect and interact through computer-mediated communication and the effects of this on their social networks and relationships.[1]

However, while attention has been paid to whether the Internet detracts from or increases offline sociability, scholars have only recently started to analyse the role of the Internet in aiding the creation of new relationships both online and offline. In particular, it has been argued that the possibility of forming new social relationships highlights the power of the Internet to reconfigure people's social networks in meaningful ways, by allowing Internet users to meet new people and make friends whom they would not otherwise have met (Dutton 1999, 2005; Rice *et al.* 2007). For example, a number of surveys conducted within the World Internet Project (WIP), a collaborative project of Internet adoption and use in countries across the globe, asked Internet users about the number of friends they have met online, and how many of these friends they later went on to meet in person (see Figure 1).[2] While the numbers vary across individuals and nations, it is clear that many users say they meet and make friends online and meet some of these people in person.

This study investigates the extent to which the Internet is used in ways that reconfigure social networks among Internet users in Britain. The findings

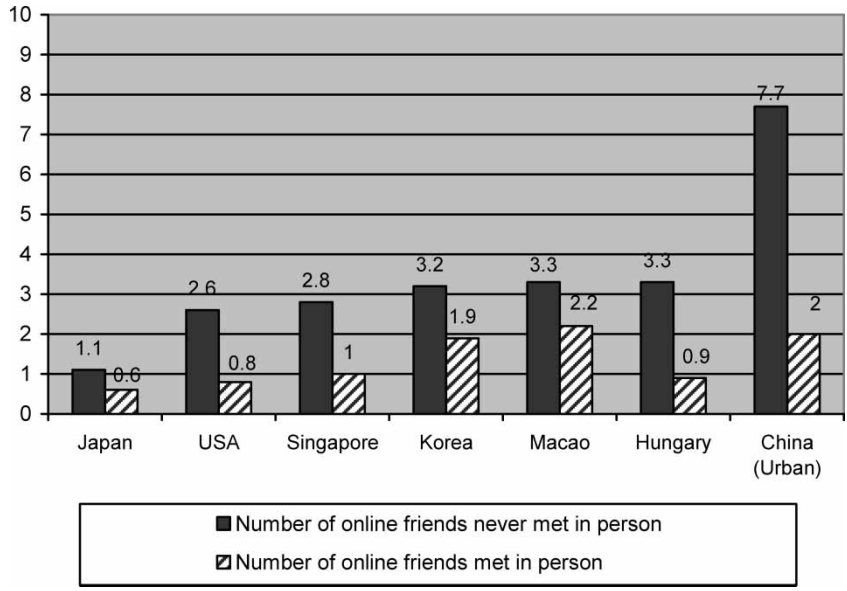

FIGURE 1 Meeting friends online. *Source*: World Internet Project: http://www.worldinternetproject.net/

support the view that the Internet is establishing itself as a powerful tool for the formation of new social relationships by enabling some individuals to meet new people and make new friends, whom otherwise they would not have met. The findings will help move the debate away from the binary issues of whether the Internet undermines or reinforces offline social ties by redirecting attention to the qualitative changes in social networks tied to use of the Internet. The next section reviews the existing research on the formation of social relationships online. This review is followed by a description of this study's survey methodology, data and indicators, before a presentation of the findings.

Making friends online: existing research findings

Communication scholars and social psychologists have been studying the effects of computer-mediated communication (CMC) on the formation and maintenance of social relationships for decades (Hiltz & Turoff 1978; Kiesler *et al.* 1984). The diffusion of the Internet in the early 1990s led to a wide range of studies (for a summary review of the literature see Baym 2002; Bargh & McKenna 2004; Chenault 1998; Thurlow *et al.* 2004; Wood & Smith 2005). Early studies were sceptical about the possibility of forming relationships online. According to traditional theories of relationship

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development, physical and geographical proximity and information about the physical appearance and social group membership of individuals were necessary pre-conditions for social relationships to develop. Therefore, the anonymity and the lack of non-verbal cues of computer-mediated communication were believed to be inimical to the formation of authentic and meaningful online relationships.

Many of the early CMC studies argued that anonymity, the lack of cues and the lower social presence of mediated communication contributed to sometimes hostile and less inhibited behaviour, as illustrated by the prominence of 'flaming' (Chenault 1998; Sproull & Kiesler 1986, 1991). This view, also known as 'cues filtered out' theory, was challenged by later studies which argued that it was the very lack of non-verbal cues and the anonymity provided by computer-mediated communication that helped to prompt the development of meaningful online relationships (Bargh *et al.* 2002; McKenna *et al.* 2002; Wellman & Gulia 1999).[3] According to this view, the lack of physical and non-verbal cues, as well as the anonymity provided by the Internet, enabled more self-disclosure and thus facilitated the formation of relationships based on shared interests and the revelation of people's true selves, which are a basis for interpersonal relationships.[4] Other studies went further to show that computer-mediated communication not only promoted the formation of meaningful relationships over time, but facilitated the formation of 'hyper-personal' relationships by promoting greater feelings of intimacy than would have otherwise been experienced in face to face relationships (Walther 1996).

Thus, academic consensus has shifted from a conception of the online world as an exotic space set apart from offline reality and hostile to the formation of meaningful social relationships, towards a conception of the online world as a new arena for meaningful social relationships which is increasingly intertwined with the offline world.

However, in spite of early theoretical interest in the effects of the Internet on social relationships, there has been a paucity of empirical evidence. Most of the early empirical research was necessarily limited to studies of the early generations of computer-mediated communication networks, such as in studies of the first computer conferencing systems (Hiltz & Turoff, 1978). Studies of early adopters or early generations of any technology raise questions about how well the findings can be applied when a technology has evolved and has become more routinely used by late adopters. The diffusion of the Internet has enabled more people to use computer-mediated communication in their everyday lives, making empirical research more feasible.

A growing number of studies have begun to explore the sociodemographic determinants and the online contexts of relationship formation online (Parks & Floyd 1996; Parks & Roberts 1998; McKenna *et al.* 2002; Russell *et al.* 2003). This is a contrast to the plethora of media stories on

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safety concerns surrounding the use of chatrooms and online dating services, especially by younger people. Still, there are far fewer studies which have explored how, if at all, these relationships migrate from online to offline settings (Parks & Floyd 1996; Parks & Roberts 1998; Mesch & Levanon 2003). The studies that have been done have concentrated on investigating the sociodemographic and personality factors which lead to the formation of online relationships in specific online settings such as within newsgroups, MOOs (Multi User Dimensions, Object Oriented) and local mailing lists (Parks & Floyd 1996; Parks & Roberts 1998; Mesch & Levanon 2003).

Mesch and Levanon (2003) investigated the conditions that led online relationships formed among members of two local mailing lists in an Israeli neighbourhood to migrate to offline settings. They found that key sociodemographic factors were not significant predictors of the online to offline transition. However, they found that one's length of membership in the online list and the use of the list for seeking help or to express opinions on community issues were positively correlated with the shift from virtual to face to face communication. Furthermore, they found that one-third of online relationships migrated to offline settings, thus concluding that mailing lists provide a powerful tool for integrating online and offline social involvement.

Parks and Floyd (1996) studied the formation of relationships within Internet newsgroups. They found that two-thirds of newsgroup users had developed a personal relationship with people they had met in the newsgroup, thus showing that relationship formation online is common. However, like Mesch and Levanon, they found that sociodemographic factors had little effect on the likelihood of forming these relationships. Parks and Floyd found that women were slightly more likely than men to have formed a personal relationship, but they found no effect of age and marital status on relationship formation. The duration and the frequency of participation in newsgroups, on the other hand, were the best predictors of relationships development, with those who had been reading their newsgroup longer and those who contributed more messages being more likely to develop relationships with other users. Thus, they conclude that it might be that 'developing personal relationships online is more a function of simple experience than it is of demographic or personality factors' (Parks & Floyd 1996, p. 87). This finding is reinforced by research on the role of experience in shaping attitudes towards, and use of, the Internet (Dutton & Shepherd 2006).

Parks and Floyd also found that relationships that develop online rarely stay only within the newsgroup setting. They found that a significant proportion of newsgroup users broadened their relationship by using other channels of communication: 98 per cent with e-mail, 35 per cent with the telephone, 28 per cent by post and 33 per cent used face to face communication. However, they did not explore the sociodemographic or personality factors which led online relationships to migrate to offline settings.

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In a later study, Parks and Roberts (1998) examined the development of personal relationships within MOOs. They found that relationship formation among the users of MOOs was virtually universal, with 93 per cent of users having formed a personal relationship with other MOOs users. Parks and Roberts found that sociodemographic factors had no impact on relationship formation among MOOs users. They found no correlation between the number of relationships reported and gender, age and education. Furthermore, they found no effect of Internet history, MOOing history and number of hours spent on MOOs per week on the number of relationships formed. As in the study by Parks and Floyd (1996), there was evidence that most relationships had migrated to other virtual environments and a third of relationships had migrated to face to face settings. Not surprisingly, those who had developed romantic relationships were more likely to have met in person than those who had developed close friends or friendships generally. Most users reported having used other communication channels before going on to meet face to face.

These studies by Mesch & Levanon, Parks & Floyd and Parks & Roberts suggest that the formation of online relationships is quite common in some user communities, thus showing that social software applications and computer-mediated communication can provide new opportunities and social contexts for personal relationships, thereby enabling people to reconfigure their social networks, intentionally or unintentionally. Evidence from these studies supports the value of a shift from a focus on the role of the Internet as isolating or connecting people – from more to less sociability – to attending to the ways in which users are reconfiguring their social networks by virtue of changing not only how they communicate with others but also with whom they communicate.

This review raises two general research questions, which we explore in this study. First, to what extent do Internet users form new social relationships online and what fosters the development of such relationships? We examine the degree to which sociodemographic factors enable us to predict the formation of relationships online as well as the features of the technology which might facilitate the formation of such relationships, such as for example the channels of communication used and the ways in which people use the Internet. Second, do these online relationships migrate to offline settings and, if so, what are the factors that influence this transition?

Our study shows that most Internet users do not make friends online, but many (20 per cent) do. Moreover, those who meet people and make friends online are likely to meet one or more of their online friends in person. While sociodemographic factors were in general poor predictors of online relationships and of transitioning online relationships to offline settings, we found that patterns of Internet use, such as using the Internet for communication versus entertainment, provide the most critical basis for explaining the development

of online friendships as well as their transitioning to offline settings. These findings should direct more attention to moving research away from mere adoption of the Internet to understanding the ways in which people choose to use this technology, such as keeping a website or posting photographs online, since these patterns of use are important in accounting for social networks formed online. In the next section we present the methodology and the operational definitions of our key dependent and independent variables.

Data and methodology

This study uses data from the 2005 Oxford Internet Survey (OxIS), a national survey of Internet adoption and use in Britain. The survey was conducted via face to face interviews in England, Scotland and Wales in February–March 2005, via the collection of a multistage probability sample of individuals at least 14 years of age.[5] The survey gained a response rate of 72 per cent, yielding 2,185 respondents, providing a strong basis for generalizing these findings to individuals 14 and over across Britain.

The context: Britain in 2005

OxIS 2005 indicated that about 60 per cent of Britons use the Internet either from home, work, school or university, an Internet café or a public library. The figure in 2003 was 59 per cent, showing that, by 2005, Internet diffusion in Britain had reached a plateau (Dutton *et al.* 2005; Dutton *et al.* 2007). Broadband technology, on the other hand, had diffused rapidly among Internet users with 11 per cent of households having a broadband connection in 2003 and 36 per cent in 2005, which equates to 59 per cent of households with Internet access. Internet use was not equally spread amongst the population: the better educated, the better off, younger people and men were more likely to be current users of the Internet. There was a digital divide in broadband access as well, but it was not as marked as the divide in Internet access (ibid.).

The dependent variables

The first research question concerns the extent to which people use the Internet to meet new people or make new friends online. The dependent variable is called '*online friendships*'. It is a binary variable, coded as 0 = 'no' and 1 = 'yes' to the question: '*Some people meet new people and make friends while they are online, others do not. Have you ever met new people or made friends online?*' This question was asked of Internet users only ($N = 1{,}309$). Previous WIP surveys asked how many friends people make online, which might have

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biased responses toward providing a number. Therefore, the present survey question was aimed at creating a neutral filter to determine whether or not users met new people and made friends online.

The second research question concerns the extent to which any relationships formed online tend to migrate to offline settings. This second dependent variable, labelled '*offline e-relationships*', indicates whether people have met their online friends in person. Those Internet users who had met new people online ($N = 265$) were asked: '*How many friends, whom you originally met online, have you since met in person?*' This numerical question on the number of individuals met in person was recoded into a binary dummy variable, with the response '0 friends' coded as 0 = 'no, have not met any online friends in person' and the response '1 friend and over' coded as 1 = 'yes, have met online friends in person'. Given the binary scores on the two behavioural dependent variables, the multivariate analyses were based on logistic regression.

The explanatory variables

The aim of this study was to identify the factors that might account for the formation of online friendships and those that migrated to offline relationships – what we labelled 'offline e-relationships'. The literature on sociability and reconfiguring access suggested four sets of explanatory variables, all of which are included in this analysis.

The first set entails sociodemographic factors. Previous studies found sociodemographic factors to be weak predictors of whether individuals formed relationships online (Parks & Floyd 1996; Parks & Roberts 1998; McKenna *et al.* 2002; Mesch & Levanon 2003; Russell *et al.* 2003). However, social circumstances, as indicated by demographic characteristics, could lead people to be more or less interested in developing new friendships or using the Internet in ways that foster relationships. In addition, existing research says little about the role of demographic factors in determining the transition of friendships from online to offline settings.

Therefore, in relation to each dependent variable, we tested the effect of the following socioeconomic factors: gender, age (coded as a categorical variable: 14–17, 18–24, 25–34, 35–44, 45–54, 55–64, 65-year-olds and over), education (no qualifications; GCSEs, A levels, vocational qualifications; degree or higher; other education) and social grade (A/B, C1, C2, D, E, where A/B are the highest social grades). We also tested the effect of marital status (single, living with partner, married, divorced/separated, widowed), employment status (working full time, working part time, unemployed, undergraduate or postgraduate student, at school, retired, taking care of the house) and self-reported health status (very poor/poor, average, good, very good). Individuals with less scope for offline sociability, such as divorced

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and retired people and people with ill health, for example, might have a greater propensity to seek online friendships than married people, people who have very good health, students or people who work full time.

The second set of independent variables includes proxy variables for Internet experience. Previous studies have shown that familiarity with the Internet, what Dutton and Shepherd (2006) have called 'proximity', can play a major role in the formation of relationships online (Parks & Floyd 1996; Parks & Roberts 1998; Mesch & Levanon 2003). However, these studies use different indicators of Internet experience in different social contexts, thus calling for a further test of the hypothesis that greater Internet experience leads to a higher probability of forming personal relationships online.

We measured Internet experience as 'length of use', indicated by the number of years a person has used the Internet. This is a categorical variable with three categories: 'veteran' users of the Internet who have used the Internet for five years or longer, 'middle range users' who have used the Internet for one to five years, and 'novices' who have used the Internet for less than one year. We developed three additional indicators of experience. The first indicator was a user's self-rated Internet ability based on responses to the question: '*How would you rate your ability to use the Internet?*' Responses were coded within three categories: 'bad/poor/fair', 'good', 'excellent'. The second indicator was the average number of hours per week a user reported spending time online. The third indicator was whether or not a user had a broadband Internet connection in the household (this was a binary variable coded as 0 = 'no' and 1 = 'yes'). We treated the use of broadband as an indicator of experience since its use enhances the range of activities that can be carried out online compared with a narrowband connection, enabling users to better integrate the technology into their everyday lives.

The third set of explanatory variables includes the online context where the relationship is formed. Existing studies have looked at the formation of online relationships and the migration of such relationships to offline settings only in certain specific online settings: MOOs (Parks & Roberts 1998), Usenet groups (Parks & Floyd 1996) and distribution lists (Mesch & Levanon 2003). Hence, we must explore whether these findings can be generalized to other contexts of online social interaction. Therefore, we looked at the impact of different online contexts of communication: blogging, posting messages on message boards, posting pictures or photos online, having a website, using a distribution list for email, chatting, instant messaging and emailing. Internet users were asked whether they had ever engaged in each of these virtual contexts of use. The variables are all categorical binary variables coded as 0 = 'no' and 1 = 'yes'.

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Interviewers asked respondents about the channel of communication they used. In addition to email, 56 per cent of Internet users reported using the Internet to instant message and 26 per cent of Internet users reported using the Internet to chat; 18 per cent of Internet users reported using the Internet to post pictures or photos; 16 per cent said they used distribution lists for emails and 16 per cent used the Internet to post on discussion or message boards. Together, these figures illustrate the numerous ways in which the Internet can support interpersonal communication: 14 per cent of Internet users reported having a website and 5 per cent reported keeping a blog. These uses might increase one's visibility online, but they are primarily a one-to-many form of communication that might be less likely than typically two-ways forms of interpersonal communication such as email or chatting to foster social relationships.

Finally, indicators of how individuals use the Internet formed our fourth set of explanatory variables. Internet users in Britain spend about 10.3 hours per week on the Internet. The Internet is a technology that can be used for many purposes, for example to gather information, to listen to music or to communicate with others. Therefore, we asked how people choose to use this technology, as patterns of use might have implications for the formation of social networks and other social outcomes.

Users employ the Internet for a wide variety of purposes. These online activities vary from email, the most common activity, with 92 per cent of Internet users reporting that they use the Internet to check their email, to less common activities such as gambling, with 9 per cent of Internet users reporting that they use the Internet for gambling. To develop more general indicators of overall patterns of use, we factor analysed the responses on the full range of Internet uses we asked about in the survey and identified dimensions of use with an eigenvalue greater than 1, based on a Varimax method of rotation (Table 1).

Table 1 shows the results of this analysis. In order of variance explained, the analysis identified six major factors. These were: '*Entertainment*', which includes the following factor loadings: finding jokes, playing games, downloading or listening to music, downloading or watching videos; '*Information*', which includes getting information about local events, looking for news, looking for sport news, checking for weather forecast; '*Banking*', which includes paying bills, online banking and investing in stocks and funds; '*Learning*', which includes looking up the definition of a word, looking up a fact, looking for school information, distant learning; '*Communication*', which includes checking email, instant message, sending email attachments; and finally '*Planning*', which includes making travel plans, looking for jobs and booking travel online.[6] The factor scores of each dimension are used as indicators of use.

TABLE 1 Factor analysis of patterns of use variables.

factor	*eigenvalue*	*Cronbach's alpha*
(1) e-entertainment	5.193	0.756
	factor loading	
find jokes	0.615	
play games	0.710	
download or listen to music	0.802	
download or watch videos	0.767	
(2) e-information		
	2.507	0.733
	factor loading	
get information about local events	0.651	
look for news	0.764	
look for sports	0.606	
check for weather	0.726	
(3) e-banking		
	1.545	0.715
	factor loading	
paying bills	0.834	
online banking	0.821	
investing in stocks and funds	0.628	
(4) e-learning		
	1.305	0.709
	factor loading	
look up a word definition	0.717	
look up a fact	0.735	
look for school information	0.741	
distant learning	0.601	
(5) e-communication		
	1.199	0.683
	factor loading	
check email	0.794	
instant message	0.633	
send email attachments	0.683	
(6) e-travel/jobs		
	1.092	0.571
	factor loading	
make travel plans	0.776	
look for jobs	0.635	
booking travel online	0.619	

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Findings

Most Internet users do not meet new people online. However, many Internet users in Britain have met new people and made friends online. As Figure 2 shows, in 2005, 20 per cent of Internet users (or about 12 per cent of Britons) answered yes, that they had met new people or made friends while they were online (Figure 2).

Moreover, of this 20 per cent, over half (56 per cent) said that they met in person at least one of the friends they had originally met online, with an average of 2.6 friends met per person (Table 2). In addition, people who had met new people or made friends online reported having on average seven online friends, whom they have never met in person (Table 2). Therefore, while it is important to emphasize that most Internet users in Britain had not made new friends online, one-fifth of them did, and in this way, many users have used the Internet in ways that have reconfigured the composition of their friendship networks.

The e-convivial: people meeting people online

Who are the people who made friends online and who went on to meet these online friends in person? Table 3 shows the sociodemographic profile of Internet users who have not met people or made friends online (in column 1),

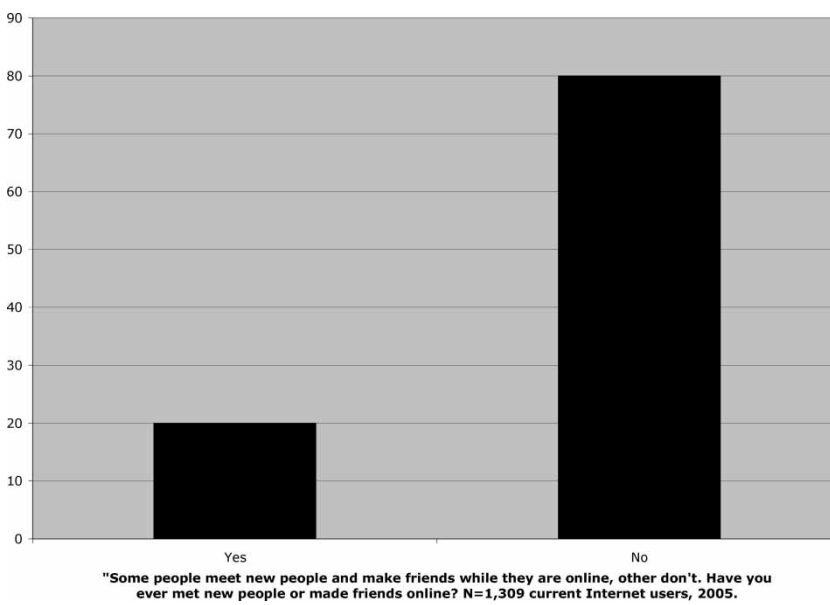

FIGURE 2 Meeting new people online.

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TABLE 2 New people met only online and in person, 2005.

number of online friends	*mean*	*median*	*range*	*standard deviation*	*valid cases (N)*
not met in person[a]	7.00	3	60	10.53	214
met in person[b]	2.30	1	30	3.85	244

[a]Question: 'How many online friends do you have whom you have never met in person?'
[b]Question: 'How many friends, whom you originally met online, have you since met in person?'

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compared with the profile of Internet users who have met new people or made friends online (in column 2), and the profile of Internet users who have not met their online friends in person (in column 3) with those who have (column 4). This comparison allows us to establish and illustrate the different sociodemographic characteristics of these four populations of users. In addition, Table 3 presents the Pearson chi-squared statistics for each pair of dependent and explanatory variables, in order to test for independence between the two variables. A significant chi-squared statistic indicates that there is a significant difference across these nominal categories.

Table 3 shows that Internet users who have made friends online, compared with those who have not, are more likely to be male, young, single, still in school and of lower socioeconomics status. Generally, there is a significant association between developing online friendships with age, social grade, marital status, employment status and health status, but no significant association between online friendships and either gender or education.

A comparison of those who have met their online friends in person and those who have not met their online friends in person shows that those who have created offline e-relationships are more likely to be male, older, working full time and with a degree or higher qualification, and less likely to be at school. In general, there was a significant association between offline e-friendships and gender, age, education, social grade and employment status but no significant association between offline e-relationships and health and marital status. Thus, looking at these zero-order relationships, not controlling for other variables, there appear to be different sociodemographic factors that influence making online friendships versus offline e-relationships.

Table 3 also enables a comparison of these groups of Internet users by their levels of Internet experience and according to the online context of communication used. Veteran users of the Internet and those who rate their ability to use the Internet as either 'good' or 'excellent' were overrepresented among both those who have made online friendships and those who have created offline e-relationships, compared with those who have not. Those who have a broadband connection in the household were more likely to have met a friend online than those who have not. Those who

TABLE 3 Descriptive statistics of users and those making friends online.

		internet users% (n = 1,309)	*made friends online % (n = 244)*	*met online friends in person % (n = 135)*
gender				
male		51	54	58
female		49	46	42
	chi-sq.	7.85**	1.12	4.65*
age				
14–17		7	18	10
18–24		13	20	21
25–34		19	21	21
35–44		23	20	23
45–54		17	11	13
55–64		11	7	10
65 +		9	2	3
	chi-sq.	313.0***	102.6***	20.74**
education				
no qualifications		10	12	10
GCSEs/A levels		66	65	60
degree or higher		21	19	25
other		3	3	4
	chi-sq.	314.45***	2.92	9.69*
social grade				
A/B		32	24	27
C1		34	37	42
C2		18	16	12
D		12	18	12
E		3	5	7
	chi-sq.	221.96***	17.13**	9.74*
marital status				
single		29	51	42
married		48	25	30
living with a partner		13	14	17
divorced/separated		8	8	8
widowed		2	1	2
	chi-sq.	170.35***	93.56***	8.80

(*Table continued*)

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TABLE 3 Continued.

		internet users% (n = 1,309)	*made friends online % (n = 244)*	*met online friends in person % (n = 135)*
employment status				
full time		49	40	47
part time		16	16	16
retired		12	6	8
unemployed		3	4	3
under-/postgraduate		5	8	10
at school		6	17	8
taking care of house		9	8	7
	chi-sq.	354.15***	84.35**	21.85**
health status				
very poor/poor		4	6	6
average		15	17	19
good		44	35	37
very good		37	42	38
	chi-sq.	129.45***	12.33**	0.92
length of use				
novices		8	4	1
middle-range users		67	64	57
veterans		25	31	41
	chi-sq.		11.84**	17.58***
self-rated ability				
bad/poor/fair		35	10	11
good		49	55	60
excellent		17	27	29
	chi-sq.		57.13***	7.20*
communication mode				
yes – chat		26	63	59
	chi-sq.		234.65***	2.45
yes – post on message boards		16	36	43
	chi-sq.		92.25***	6.64*
yes – post photos		18	34	45

(*Table continued*)

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TABLE 3 Continued.

		internet users% (n = 1,309)	*made friends online % (n = 244)*	*met online friends in person % (n = 135)*
	chi-sq.		56.87***	18.50***
yes – have a website		14	25	30
	chi-sq.		35.15***	3.27
yes – keep a blog		5	7	10
	chi-sq.		3.07	3.59
yes – instant message		56	82	84
	chi-sq.		87.42**	1.39
yes – distribution list		16	22	28
	chi-sq.		7.19**	6.5**
yes – email		92	96	99
	chi-sq.		5.53*	8.12**
broadband				
yes		36	74	75
no		64	26	25
	chi-sq.	10.10**	10.10**	0.40
	total	**100%**	**100%**	**100%**

*$p < 0.05$; **$p < 0.01$; ***$p < 0.001$.

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chat, those who post on message boards, those who put photos or pictures on the Internet, those who have a website, those who instant message, those who use a distribution list for emails and those who email were over-represented among those who have made online friendships compared with those who have not. There was no significant association between keeping a blog and having made a friend online.

Among those who have created offline e-relationships, those who post on message boards, those who post photos, those who email and those who use a distribution list for email were over-represented compared with those who have not created offline e-relationships. There was no significant association between chatting, having a website, keeping a blog and instant messaging with the establishment of offline e-relationships. Furthermore, those who use chat-rooms were the most likely to have made online friendships, with half of those who chat reporting having met people online, compared with 46 per cent of

those who use message boards, 38 per cent of those who post pictures and photos on the Internet, 37 per cent of those who have a website, 30 per cent of those who blog, 30 per cent of those who use instant messaging, 27 per cent of those who use distribution lists and 21 per cent of those who email.

Multivariate analysis

In order to identify the best predictive model of the factors shaping the development of online friendships and offline e-relationships, we ran a multivariate analysis of our two dependent variables by entering sequentially the four sets of explanatory variables, described above. These multiple regressions enable us to assess the net effect of the different hypothesized predictors. This section examines each dependent variable in turn. Table 4 presents the results of the multivariate logistic regression on the dependent variable 'online friendships' and Table 5 presents the same type of analysis on the dependent variable 'offline e-relationships'.

In both tables we test four models: the first model includes only the sociodemographic variables as the independent variables. In Model 2 we add the set of Internet experience variables, thus controlling for these variables. In Model 3 we control for the online context of communication. Finally, in Model 4 we control for individual patterns of Internet use. By comparing the changes in the Beta coefficients across the four models we can assess change in the net effect of the independent variables, controlling for the other independent variables, and compare the overall goodness of fit of the four models.

Online relationships

Table 4 shows that, overall, sociodemographic factors were not significant predictors of making online friendships. The exception is marital status: both single people and those living with a partner were more likely to have made online friendships than married people. Interestingly, age was a significant predictor of online friendships in Model 1, with 14–17-year-olds, 18–24-year-olds, 25–34-year-olds and 35–44-year-olds more likely to meet friends online than people aged 65 and over; however, the effect of age disappears once we control for Internet experience, the channel of communication used and patterns of Internet use.

Controlling for other factors, none of the Internet experience variables was a significant predictor of online friendships, with the exception of hours spent online: the more hours spent online, the more likely one was to develop an online friendship. Interestingly, self-rated Internet ability was a significant predictor of online friendships: the higher one's self-rated expertise, the more likely one is to develop an online friendship. However, this

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TABLE 4 Logistic regression of 'online friendships'.

	model 1		*model 2*		*model 3*		*model 4*	
	b	*s.e.*	*b*	*s.e.*	*b*	*s.e.*	*b*	*s.e.*
sociodemographics								
gender								
female	−0.28	0.19	−0.13	0.20	0.06	0.22	−0.05	0.24
age								
14–17	1.47*	0.71	1.46*	0.72	0.90	0.78	0.53	0.80
18–24	1.26*	0.64	1.03	0.66	1.00	0.72	0.99	0.71
25–34	1.35*	0.61	1.16	0.63	1.06	0.69	1.11	0.68
35–44	1.38*	0.59	1.22*	0.61	1.35*	0.67	1.33*	0.66
45–54	0.68	0.62	0.47	0.63	0.63	0.70	0.62	0.68
55–64	0.74	0.57	0.48	0.58	0.91	0.64	0.79	0.63
education								
GCSEs/A levels/vocational	−0.05	0.30	0.09	0.33	0.22	0.35	0.13	0.36
degree or higher	0.14	0.37	0.08	0.39	0.40	0.45	0.05	0.47
other education	0.27	0.55	0.60	0.58	1.29	0.65	1.25	0.67
social grade								
A/B	−0.84	0.50	−0.58	0.53	−0.32	0.59	0.02	0.61
C1	−0.43	0.49	−0.30	0.52	−0.01	0.58	0.17	0.59
C2	−0.67	0.51	−0.40	0.53	−0.22	0.59	−0.01	0.61
D	−0.12	0.51	0.29	0.53	0.42	0.60	0.74	0.62
employment status								
full time	−0.20	0.47	−0.40	0.49	−0.57	0.54	−0.46	0.55
part time	0.21	0.49	0.15	0.51	0.01	0.57	0.04	0.57
unemployed	0.08	0.65	−0.06	0.68	0.11	0.77	0.49	0.79
under/postgraduate	0.33	0.59	−0.19	0.62	−0.73	0.69	−1.39	0.73
at school	0.98	0.63	0.70	0.64	0.94	0.71	0.84	0.74
taking care of the house	0.13	0.54	0.19	0.56	0.34	0.62	0.40	0.64
health status								
very poor/poor	0.77	0.45	0.55	0.47	1.01	0.51	1.30*	0.53
average	0.27	0.26	0.28	0.27	0.52	0.31	0.58	0.32
good	−0.13	0.20	−0.10	0.21	0.04	0.23	0.10	0.24
marital status								
single	1.04***	0.28	1.00**	0.29	1.04**	0.33	1.02**	0.34
living with partner	0.97***	0.27	1.01***	0.29	0.95**	0.32	1.05**	0.33
divorced/separated	0.70*	0.34	0.90**	0.35	0.54	0.43	0.62	0.44
widowed	0.92	0.74	1.14	0.79	1.19	0.85	1.18	0.88

(*Table continued*)

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TABLE 4 Continued.

	model 1		*model 2*		*model 3*		*model 4*	
	b	*s.e.*	*b*	*s.e.*	*b*	*s.e.*	*b*	*s.e.*
internet experience								
self-rated internet ability								
good	–	–	0.74**	0.24	0.46	0.27	0.40	0.28
excellent	–	–	0.92**	0.30	0.50	0.34	0.19	0.36
years online								
middle-range users	–	–	0.61	0.41	0.49	0.45	0.52	0.47
veterans	–	–	0.73	0.44	0.73	0.48	0.77	0.51
hours online	–	–	0.04***	0.01	0.03**	0.01	0.02*	0.01
broadband								
yes	–	–	0.12	0.20	0.00	0.23	−0.06	0.25
communication context								
keep a blog	–	–	–	–	−1.94***	0.48	−2.10***	0.50
post on message board	–	–	–	–	0.85***	0.26	0.82**	0.27
posting photos	–	–	–	–	0.60*	0.27	0.62*	0.28
keep a website	–	–	–	–	0.63*	0.29	0.66*	0.30
post on distribution list	–	–	–	–	0.15	0.30	0.45	0.31
chat	–	–	–	–	1.92***	0.23	2.10***	0.25
instant message	–	–	–	–	0.59*	0.28	0.09	0.32
email	–	–	–	–	−0.20	0.57	−0.94	0.64
internet use factors								
entertainment	–	–	–	–	–	–	0.13	0.14
information	–	–	–	–	–	–	0.00	0.11
banking	–	–	–	–	–	–	−0.11	0.11
learning	–	–	–	–	–	–	0.44***	0.11
communication	–	–	–	–	–	–	0.57**	0.17
travel/jobs	–	–	–	–	–	–	0.09	0.11
constant	−2.41***	0.74	−4.28***	0.88	−5.65***	1.09	−4.78***	1.17
overall % explained	79.6		80.6		83.3		85.0	
Cox & Snell R square	0.13		0.18		0.29		0.32	
Nagelerke R square	0.20		0.28		0.46		0.49	
N	1,039		1,039		1,039		1,039	

*$p < 0.05$; **$p < 0.01$; ***$p < 0.001$.

Reference categories: male, 65+, no qualifications, social grade E, retired, health status: very good, married, bad/poor/fair internet ability, novices, no broadband, no blog, no message board use, no photo posting, has no website, no distribution list, no chat, no instant message, no email.

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TABLE 5 Logistic regression of 'offline e-relationships'.

	model 1		*model 2*		*model 3*		*model 4*	
	b	*s.e.*	*b*	*s.e.*	*b*	*s.e.*	*b*	*s.e.*
sociodemographics								
gender								
female	−0.76*	0.39	−1.02*	0.50	−1.07*	0.49	−1.51**	0.60
age								
14–17	−0.05	1.89	−0.55	2.14	−0.43	2.20	−0.29	2.28
18–24	−0.02	1.82	−1.07	2.07	−0.91	2.18	−0.57	2.23
25–34	−0.87	1.73	−2.07	2.01	−1.81	2.07	−1.59	2.13
35–44	−0.30	1.70	−1.18	1.95	−0.89	2.02	−0.96	2.11
45–54	−0.53	1.64	2.02	1.95	−1.76	2.03	−1.77	2.09
55–64	1.02	1.46	−0.27	−0.27	−0.85	1.84	−1.26	1.93
education								
GCSEs/A levels	−0.44	0.57	−0.41	0.63	−0.65	0.72	−0.81	0.77
degree or higher	0.55	0.76	0.54	0.84	0.12	0.96	−0.77	1.07
other education	0.22	1.23	−0.15	1.30	−0.16	1.42	−1.38	1.50
social grade								
A/B	−3.03**	1.10	−3.65***	1.30	−4.39***	1.32	4.85***	1.39
C1	−2.11*	1.05	−2.70*	1.23	−3.01*	1.23	−3.52**	1.30
C2	−2.92**	1.07	−3.85**	1.27	−4.20***	1.30	−4.46***	1.38
D	−3.54**	1.12	−3.89**	1.31	−4.21**	1.34	−4.62***	1.41
employment status								
full time	0.58	1.46	0.26	1.64	0.05	1.70	0.49	1.79
part time	0.46	1.56	0.42	1.78	−0.46	1.82	−0.67	1.96
unemployed	−1.36	1.71	−2.26	1.92	−2.95	1.99	−2.85	2.13
under/postgraduate	0.62	1.62	0.24	1.82	−0.61	1.94	−1.18	2.11
at school	−0.84	1.65	−1.84	1.91	−2.53	1.99	−2.30	2.15
taking care of the house	−0.87	1.61	−0.65	1.85	−1.17	1.92	−1.25	2.00
health status								
very poor/poor	−0.28	0.88	−0.87	1.00	−1.05	1.09	−0.10	1.25
average	−0.60	0.53	−0.50	0.57	−0.24	0.67	−0.03	0.72
good	−0.01	0.42	−0.23	0.47	−0.20	0.55	−0.02	0.60
marital status								
single	−0.75	0.64	−0.52	0.70	−0.46	0.78	−0.39	0.80
living with partner	−0.40	0.63	0.03	0.67	−0.26	0.76	−0.31	0.79
divorced/separated	−0.20	0.81	0.47	0.91	0.58	1.02	1.15	1.15
widowed	−0.88	1.75	−0.69	2.28	0.38	2.42	−0.38	2.48

(*Table continued*)

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TABLE 5 Continued.

	model 1		*model 2*		*model 3*		*model 4*	
	b	*s.e.*	*b*	*s.e.*	*b*	*s.e.*	*b*	*s.e.*
internet experience								
self-rated internet ability								
good	–	–	1.49**	0.55	1.24	0.64	1.47*	0.70
excellent	–	–	0.78	0.61	0.45	0.71	0.59	0.79
years online								
middle-range users	–	–	3.40**	1.08	3.11**	1.09	3.40**	1.22
veterans	–	–	3.43**	1.09	3.42**	1.14	3.92**	1.31
hours online	–	–	0.05*	0.02	0.03	0.02	0.02	0.03
broadband								
yes	–	–	0.29	0.45	0.23	0.52	0.19	0.58
communication context								
blog	–	–			3.52	2.21	3.73	2.28
message board	–	–			0.19	0.57	0.17	0.62
posting photos	–	–			1.78**	0.66	1.70*	0.69
website	–	–			−0.47	0.64	−0.69	0.67
distribution list	–	–			−0.51	0.72	−0.37	0.82
chat	–	–			−0.90	0.57	−0.41	0.64
instant message	–	–			−0.11	0.75	−0.17	0.91
email	–	–			2.72	1.91	3.05	2.62
internet use factors								
entertainment	–	–	–	–	–	–	−0.25	0.30
information	–	–	–	–	–	–	0.23	0.27
banking	–	–	–	–	–	–	0.22	0.27
learning	–	–	–	–	–	–	0.52	0.29
communication	–	–	–	–	–	–	0.20	0.41
travel/jobs	–	–	–	–	–	–	0.37	0.27
constant	4.34**	1.67	1.05	1.97	0.18	2.78	0.14	3.59
overall % explained	71.5		78.2		81.4		81.0	
Cox & Snell R square	0.21		0.30		0.38		0.41	
Nagelerke R square	0.29		0.41		0.51		0.55	
N	194		194		194		194	

*$p < 0.05$; **$p < 0.01$; ***$p < 0.001$. Reference categories: male, 65+, no qualifications, social grade E, retired, health status: very good, married, bad/poor/fair internet ability, novices, no broadband, no blog, no message board use, no photo posting, has no website, no distribution list, no chat, no instant message, no email.

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effect disappears once we control for the communication context employed and how the Internet is used, suggesting that ability has an indirect effect through shaping patterns of use.

The online context of communication had a significant effect on forming online friendships. Those who post messages on a message board, those who post photos on the Internet, those who keep a website and those who chat were more likely to meet friends online than those who do not, controlling for all of the other variables, whereas blogging had a significant negative effect on making online friendships. Conversely, using a distribution list for email, instant messaging and emailing had no significant effect on making new online friendships. This underscores the tendency for most users to communicate over email and chat-rooms in ways that complement and reinforce their existing social networks.

Finally, we found that using the Internet for learning and for communication increased the probability of making new friends online, controlling for all the other variables. Conversely, using the Internet for entertainment, information, banking or planning had no significant effect on meeting new friends online.

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Offline e-relationships

Table 5 shows that different factors are associated with moving online relationships into the offline world, what we call 'offline e-relationships'. Among the sociodemographic factors, age, education, employment status and marital status were not significant predictors of whether a user moves from online to offline e-relationships. On the other hand, being female had a significant negative effect on building offline e-relationships (meaning that females were much less likely than males to go on to meet online friends in person), and those from higher social grades (A/B, C1, C2 and D) were less likely to form offline e-relationships than those in the lowest social grade (Grade E).

Unlike the case of meeting friends online, the length of Internet use was a significant predictor of creating offline e-relationships. In particular, both veteran users of the Internet and middle-range users were much more likely than novices to have met online friends in person, controlling for all other variables. Among communication contexts, posting pictures or photos on the Internet increased the probability of making offline e-relationships. Finally, none of the different types of Internet use had a significant effect on whether users migrated their online friendships offline, to the extent of meeting someone in person.

Conclusions and discussion

This study can inform a growing debate on the implications of Internet use for social relationships by showing that the impact of the Internet should not be understood simply in terms of whether adoption of the Internet has

consequences for increasing, reducing or maintaining sociability. The focus should instead be on the ways that the technology is used, and how patterns of use can transform the composition of one's social networks – reconfiguring networks of communication.

About one-fifth of Britons in 2005 were using the Internet in ways that are reconfiguring their friendship networks. The Internet is not only changing the way they communicate with people and the ways in which they make friends, but is also enabling them to meet people whom they would not otherwise have met.

Moreover, half of the users who have made online friends have gone on to meet their online friends in person, showing how the Internet has established itself as a powerful networking tool on- and offline. In this sense, this study reinforces the view that a primary social role of the Internet is to reconfigure social relationships in meaningful ways (Dutton 1999, 2005; Mesch & Levanon 2003; Rice *et al.* 2007). It changes how we communicate, and who we know – reconfiguring networks of friendships.

Confirmation of this social use of the Internet in Britain comes from a 2005 European survey by Nielsen NetRatings, which reported that the Internet is the third most popular place of choice where Britons, the French and Germans would go to find a partner (41 per cent), after friends (51 per cent) and pubs and clubs (44 per cent) (Nielsen NetRatings 2005). Evidence from WIP (see Figure 1), also shows how the development of online friendships is not unique to Britain. Even with a neutral filter question, as employed in OxIS, a sizeable proportion of Internet users are making new acquaintances through this virtual space.

When analysing the factors that shape whether people make online friendships or create offline e-relationships, four different explanatory models were identified. Each highlighted how different explanatory variables have different impacts on each of the dependent variables. In general, in line with existing research, sociodemographic factors were found to be poor predictors of social networking, having few direct associations with any dependent variable. The exceptions were marital status, gender and social grade.

Marital status had a direct effect on making online friendships, with single people and those living with a partner being more likely to make online friends than married people, showing that life circumstances do matter, as suggested by the popularity of online dating sites for single people. While there was no gender effect on making online friendships, gender did have a direct relationship with the propensity of individuals to translate online relationships into real-world encounters or offline e-relationships. Women were less likely than men to go on and meet their online friends in person. This pattern suggests that such factors as concerns over safety might be preventing many individuals, and women in particular, from taking advantage of the potential for social networking offered by the Internet.

Finally, while social grade was not related to making online friendships, it had a direct relationship with creating offline e-relationships, with people

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from a lower social grade, compared with higher social categories, being more likely to meet their online friends in person. There are a variety of alternative explanations for this relationship, which our data do not enable us to test, but it could reflect the potential for the Internet to broaden the geographical and social diversity of interpersonal networks in line with the findings of Mesch and Levanon (2003). The Internet could provide an opportunity for less socially advantaged individuals to meet people from outside their immediate social circles.

These results show that, while a gender divide remains in the propensity to move online relationships to offline e-relationships, life circumstances such as marital status and socioeconomic status play a greater role than sociodemographic factors, such as age, in moderating the use of the Internet for social networking. In particular, while age did have an association with making online relationships, its effect disappeared once patterns of Internet use were taken into account, suggesting an indirect effect of age in shaping choices about how to use the Internet.

In line with previous research, Internet experience, measured as length of Internet use, had a significant direct effect on creating offline e-relationships, with veteran users of the Internet being more likely to do so than novices, suggesting that greater familiarity with the Internet reduces the perceived risk of using such a technology for social networking purposes. This is consistent with research on the Internet as an experience technology, where trust in the Internet and its use for a wider range of activities, such as for communication and learning, is shaped by one's experience with it (Dutton & Shepherd 2006). Specifically, Dutton and Shepherd found that more experience online is related to a greater sense of confidence in the people one can meet on the Internet. Also in line with existing research, we found that the hours spent online had a positive effect on making online friendships, showing how the time spent on online social network spaces facilitates the development of social relationships with other users.

A key finding of this study was the impact of different patterns of Internet use, showing that the ways in which people use the Internet either intentionally or unintentionally produce identifiable social outcomes. Previous research has tended to focus on mere access to the Internet rather than differences in patterns of use (Katz & Rice 2002; Rice *et al*. 2007). Individual users shape the Internet to serve different purposes. We found that what the Internet is used for had significant effects on meeting friends online (although it had no effect on transitioning these to offline e-relationships, beyond that of spending more time online). In particular, those who use the Internet for learning and communicating were more likely to make online friendships, as these are inherently social activities. However, we found no effect of using the Internet for entertainment on making new online friends – surprising given the popularity of downloading music and videos, but not surprising given that the downloading of music and other entertainment is a many-to-one network that can support isolation as well as sociability.

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Similarly, the use of different online channels of communication also had independent relationships with the two dependent variables. While posting messages on message boards, posting photos on the Internet, having a website and chatting increased the chance of making online friendships, posting pictures or photos increased the probability of creating offline e-relationships, supporting other findings that once people meet online they pass through other channels of communication before going on to meeting face to face, such as by exchanging photos of each other. Blogging, on the other hand, had a negative effect on making online friendships. This reinforces the developing view of bloggers as one-to-many broadcasters, rather than one-to-one or interactive communicators, fostering interpersonal relationships. This is consistent with the degree to which bloggers are engaged in a dialogue – since only a small proportion of bloggers and blogs gain an audience or comments from an audience.

The growing popularity of online multi-player gaming for example and its role in the creation of online communities and, even more importantly, the rise of online social networking applications such as Facebook, Flickr, Friendster, MySpace, and YouTube, which allow users to come into contact and interact with many other users, are likely to further reinforce the role of Internet usage patterns on the development of social networks. Exploration of these survey results needs to be extended beyond 2005, and complemented by a qualitative analysis of how users conceptualize online 'friendships' in order to explore the social dynamics of online relationship formation more fully.

Taken together, this analysis demonstrates that the dynamics of online friendships are not driven by any mechanistic social or technological determinism. To the contrary, they seem to be driven by one's experience as a user, by the often idiosyncratic ways people use the Internet and by the strategic digital choices that users make, such as posting their photographs or using the Internet for communication, learning or entertainment.

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Notes

1 An evolving list of social networking sites is available at: http://socialsoftware.weblogsinc.com/2005/02/14/home-of-the-social-networking-services-meta-list/ (last accessed 5 November 2006).

2 See the World Internet Project website at: <http://www.worldinternetproject.net/> (last accessed 5 November 2006).
3 This work on CMC draws heavily from earlier research on the social psychology of telecommunications, most often focused on audio and video teleconferencing, which developed concepts such as social presence and notions of filtered cues (Short *et al.* 1976).
4 Several studies have shown the importance of homophily, i.e. similarity, for the development of meaningful and long-lasting relationships both online and offline (McPherson *et al.* 2002; Mesch 2005).
5 A full description of the sampling strategy is described in Dutton *et al.* (2005, pp. 58–59). This report is available online at: http://www.oii.ox.ac.uk/research/oxis/oxis2005_report.pdf
6 The following Internet activities did not load on any of the six factors identified: gambling, reading blogs, looking up religious sites, looking up sexual sites, making or receiving phone calls, listening to radio stations, looking up the family tree, looking for product information, buying products online, chatting, surfing or browsing.

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